

PROGRAM PLAN
INDEPENDENT DESIGN REVIEW
OF
CLINTON POWER STATION, UNIT 1

Prepared for
Illinois Power Company
Decatur, Illinois

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Bechtel Power Corporation
San Francisco, California
July 1984

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CLINTON POWER STATION
INDEPENDENT DESIGN REVIEW PROGRAM PLAN

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GLOSSARY

Observation - A condition wherein the IDR, Level-1 Committee believes there is a failure to meet licensing commitments or other safety-related design requirements

Potential Observation Report - A preliminary internal report for the documentation of an Observation

Observation Report - Level-1 Internal Review Committee documentation of its evaluation of an Observation

Resolution Report - Documentation of the resolution of an Observation

Completion Report - Documentation of action taken (disposition) to complete the review effort associated with an Observation

Level-1 Internal Review Committee - A committee made up of key IDR team members

Level-2 Internal Review Committee - A committee made up of senior members of Bechtel Power Corporation who are not part of the IDR team

Safety Significant Condition - A condition confirmed to exist which results in a loss of safety function to the extent that there is a major reduction in the degree of protection provided to public health and safety

Program Plan
Independent Design Review
of
Clinton Power Station, Unit 1

I. Introduction and Summary

This Program Plan defines the program for the independent design review (IDR) by Bechtel Power Corporation (BPC) of specified activities related to design of Unit 1 of the Clinton Power Station of Illinois Power Company (IP), and mainly covering work by Sargent & Lundy Engineers (S&L). Work by other design contractors may also be evaluated when they have performed design which is part of the specified activities, and where there is evidence this could be important to results of the review. This Program Description is intended to be fully responsive to the requirements set forth in the letter of May 31, 1984 from Mr. D. P. Hall of Illinois Power Company to Mr. J. G. Keppler of the NRC, and the letter of June 19, 1984 from Mr. D. P. Hall to Mr. Peter Karpa of Bechtel Power Corporation.

The purpose of this design review will be to provide additional assurance that the design of the Clinton Power Station meets licensing requirements, through a review of the technical adequacy of selected systems and the design process (i.e., design system). Both vertical and horizontal-type reviews will be employed. For the vertical review, two systems have been selected: the high pressure core spray (HPCS) and the Class 1E ac electrical distribution system. For the horizontal review,

the adequacy of the design process on Clinton will be reviewed using as a data base the results of review reports on Byron, La Salle, and Fermi stations, and other information from previous reviews by IP and others.

From the vertical and horizontal reviews, an assessment will be made both of the adequacy of the systems reviewed and of areas of the plant design which were not specifically reviewed, including positive aspects of the design work. Where appropriate, deficiencies identified will be evaluated for underlying, root causes.

The program for the review of each system is divided into the tasks listed below.

Task 1	Design Requirements
Task 2	Design Adequacy
Task 3	Design Process
Task 4	General Assessment

Each of these tasks is described in more detail in the respective sections and is intended to incorporate all of the IDR work described in the May 31 letter and its Attachment 2, and to reflect results of the June 28, 1984 meeting with the NRC in Bethesda, Maryland. For editorial simplification, S&L is referred to as the reviewee, but it is understood that there may be others as well, and this program will apply similarly to them.

The review will be performed by a dedicated project team, comprised of qualified personnel from Bechtel Power Corporation. The work will be performed under the direct surveillance of the Manager of Engineering,

Bechtel Power Corporation to whom the Programs Manager and the Project Manager of the review team will report for project direction. The majority of the review team will be comprised of personnel from Bechtel's San Francisco Power Division and the Corporate group, but there will be some individuals drawn from other Bechtel entities when beneficial to the effort. Most activities of the team will be physically divided between the Chicago offices of S&L, the Clinton site, and Bechtel offices in San Francisco, to expeditiously achieve the objectives of the review.

A formal protocol will be observed for IDR activities to achieve reviewer independence and freedom from outside influence, on the scope of a reviewer's work, on observations and/or conclusions. Also, this protocol will provide for access to results of the IDR by authorized outside parties, including participants in the licensing proceedings. A copy of the protocol from the aforementioned June 19, 1984 letter is provided in Appendix A.

There are no known conflicts of interest by Bechtel Power Corporation, or by individuals on the IDR team, which would prevent this review team from arriving at objective conclusions from the review, or which would otherwise compromise the purposes of the review. To support this and the IDR independence criteria⁽¹⁾, each member of the IDR team will be required to execute an IDR agreement⁽²⁾ and an IDR questionnaire⁽³⁾.

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- (1) Exhibit 1 to May 31, 1984 letter, D.P. Hall to J.G. Keppler, titled Independence Criteria
 - (2) Enclosure to June 19, 1984 letter, D.P. Hall to P. Karpa, titled Agreement Concerning Independent Design Review of Clinton Power Station
 - (3) Enclosure to June 19, 1984 letter, D.P. Hall to P. Karpa, titled Clinton IDR Personnel Questionnaire

Also, BPC will execute appropriate corresponding documents for the Corporation.

Work will be scheduled for an interim report to be submitted by September 30, 1984, a draft final report by November 16, and a final report by approximately December 15, 1984.

The Bechtel work will be performed under the requirements of its Corporate quality assurance program (BQ-TOP-1, Rev. 3A), which has been approved by the NRC. Implementing procedures will comply with the applicable requirements of the quality assurance program, and some will be based upon the standard Bechtel Engineering Department Procedures (EDPs). The quality assurance program for the IDR is described in Appendix B, and will be implemented in accordance with approved procedures. Applicable portions used in the IDR will be discussed in the Final Report.

II. Task Descriptions

The tasks described here have been organized to allow a thorough review of the specified systems and the design process reviews listed below. Upon completion of the review, conclusions will be drawn appropriate to the objectives and commensurate with the review work performed.

Subjects reviewed will be as follows:

- High pressure core spray (HPCS) system design.

- Class 1E ac electrical system design.

- Design review reports from Clinton and other relevant designs.

System boundaries will be as generally described in the FSAR. The review will cover mechanical, electrical, environmental, instrumentation and control, plant arrangements, and relevant nuclear engineering and structural aspects of the design of each system. For the Class 1E ac electrical system the review will specifically include the medium voltage part of the safety-related system, but BPC will have the option to delete all or part of the low voltage system if, in BPC judgement, this will not add importantly to the results.

The design process will be evaluated by evaluating Clinton-specific work, as well as reports of similar reviews of other, relevant designs by S&L, including those noted previously. The extent these other reviews will be used will be determined by their relevance to Clinton, availability of reports (i.e., public domain), and overall value to assessing effectiveness of the S&L design process on Clinton. At present, it is contemplated that the IDR will review Integrated Design Inspection (IDI) reports by other reviewing organizations. The public-domain responses to these reports will also be reviewed. Also, results of previous IP-sponsored reviews will be specifically evaluated, including that by INPO.

The reports of these other reviews will be used to develop a data base to assist in interpreting results from the review of the Clinton Station, including establishing trends and pointing to areas worthy of special attention. Special attention will be given to using these reviews in determining underlying root causes of observations at Clinton and in evaluating the adequacy of proposed resolution of these observations for Clinton.

The extent of the review in any given area will be determined by the review team, on the basis of the importance to safety of the area and what is found during the review. If the review detects deficiencies, then the area will be reviewed more intensively than otherwise. Special effort will be directed to determining root or basic causes for significant or recurring deficiencies.

For convenience of identifying separate review activities, the review of each system has been divided into the four tasks. In practice, however, they will be integrated and performed as a relatively continuous activity for each discrete piece of the design. That is, each design area being reviewed will (1) have its requirements established, (2) be reviewed for technical adequacy, (3) have the design process assessed during the review for adequacy, and (4) be incorporated into the evaluation of broader implications. These are the basic Tasks previously identified. In organizing the work and reports, some Tasks will be further subdivided to focus on areas of special interest. The relationship of Tasks to subjects and design areas for review is shown in Table 1.

TABLE 1
REVIEW SUBJECTS vs. TASKS

REVIEW (1) SUBJECTS	<u>TASKS</u>							
	<u>Licensing Require- ments</u>	<u>Design Adequacy</u>	<u>Design Process</u>	<u>Design Interface w/GE & Other</u>	<u>Design Change Control</u>	<u>S&L Design Reviews</u>	<u>Common(2) Require- ments</u>	<u>As-Built Control Walkdown</u>
<u>HPCS System</u>								
Mech. Systems	x	x	x	x	x	x	x	x
Mech. Components	x	x	x	x	x	x	x	x
Civil - Structural	x	x	x	x	x	x	x	x
Electrical Power	x	x	x	x	x	x	x	x
Inst. & Control	x	x	x	x	x	x	x	x
Design System	x	x	-	x	x	x	x	x
Design Standards	x	x	-	-	-	-	x	x
<u>Electrical System (1-E,ac)</u>								
Electrical Systems	x	x	x	x	x	x	x	x
Electrical Components	x	x	x	x	x	x	x	x
Civil - Structural	x	x	x	x	x	x	x	x
Inst. & Control	x	x	x	x	x	x	x	x
Design System	x	x	-	x	x	x	x	x
Design Standards	x	x	-	-	-	-	x	x
<u>Other Reviews</u>								
Observations	x	x	x	x	x	x	x	-
Corrective actions	x	x	x	x	x	x	x	-
Root cause analysis	x	x	x	x	x	x	x	-

(See Notes for details)

Table 1 (Cont)

NOTES

- (1) Included in Review Subject areas are the following:

Mechanical Systems include process design, environmental and separation, requirements, and system descriptions

Mechanical Components includes stress analysis, piping design, pipe supports, environmental qualification and technical specifications

Civil-Structural includes seismic analysis, structural supports design, and seismic qualification

Instrumentation and Control includes control system design, separation, protection system, and annunciation

Electrical Systems includes system single-lines schematics wiring diagrams, cable separation and system descriptions

Electrical Components includes environmental qualification, technical specifications, and cable installations.

Design Systems includes procedures and other controls, design tools, and quality program

Design Standards includes standard drawings and requirements, interpretations of codes and standards and standard specifications.

- (2) Common Requirements refers to design requirements for HELB/MELB, fire protection, and Class II-over-I design.

Task 1
Design Requirements

General

Task 1 will be to determine the extent to which design criteria or other design objectives match licensing commitments. These will be used to implement Tasks 2 and 3, and to assess how design inputs are specified.

The sources of the commitments will be the FSAR, responses to NRC questions on the FSAR, and such other documents as Illinois Power specifically identifies.

Sub-Tasks

- 1A Establish checklists to perform Task 1.

- 1B Review FSAR and other documents specified by IP to identify safety-related design criteria or other safety-related commitments and design requirements. This includes IP responses to NRC questions.

- 1C Review IP and S&L procedures for specifying design requirements.

Compare design requirements to the inputs used by S&L in developing designs or other documents, such as specifications. In doing this, due recognition will be given that there are many ways design requirements may be specified. Also, where interpretations of requirements are made, the justifications for apparent differences will be sought.

Effective dates for codes and standards will be confirmed.

- 1D Review engineering output documents, as appropriate, to determine if requirements are suitably reflected. These documents include procurement specifications and construction drawings.
- 1E Interview selected, key S&L personnel so that reviewers correctly understand how requirements are interpreted.
- 1F Identify and process potential Observations and incorporate results in the reports issued.

Task 2
Design Adequacy

General

Task 2 will be to review each of the selected systems for adequacy in meeting the licensing commitments and safety-related design requirements. These commitments and requirements will be those determined from Task 1. This will include a review of the installed (as-built) condition to compare actual configuration with that used in design.

To assess design adequacy, primary reliance will be placed on the results as described in output documents. It will be recognized there are many ways to arrive at an adequate design which meets requirements. No attempt will be made to re-verify each step in designing the specified systems. Instead, the designs will be reviewed for accurate inputs and reasonableness of outputs, and adequacy of the design techniques based on a review and sampling of the work. Independent calculations will be performed to the extent appropriate and in accordance with IDR team guidelines, to provide alternate means of verification or where proprietary methods are involved, but not as a general rule.

In judging accuracy and completeness of design documents, due recognition will be given to established professional engineering practices and other precedents established in the nuclear industry. This judgement will consider the level of detail needed to link design requirements with the output documents, and the process employed. It will also consider needs to justify design decisions and assumptions.

Sub-Tasks

- 2A Establish checklists to perform Task 2.
- 2B Assemble design requirements for the specified systems.
- 2C Review selected design documents for the following:
 - 1. Safety classifications, to determine if the structures, systems, and components have been properly classified as to safety significance as defined in 10CFR50.
 - 2. Accuracy and completeness of the design criteria and other inputs, including assumptions and codes or standards.
 - 3. Applicability of standard design methods.
 - 4. Method of analysis, to determine if an appropriate method was used, including mathematical models, and use of standards.
 - 5. Engineering judgements and assumptions and the basis on which they were exercised and utilized.
 - 6. Accuracy of implementing the analysis, including use of properly validated computer codes.
 - 7. Adequacy of means by which designs were verified.
 - 8. Translation of design into output documents, for completeness, clarity, and proper control.
 - 9. Reasonableness of the output, in relation to similar designs.

In performing the above reviews, each system will be reviewed from the standpoint of an integrated design, properly coordinated between disciplines. It will include mechanical, electrical, nuclear, instrumentation and control, and civil/structural aspects of the design.

The last design revision will be considered as the basis of the review. This revision may be a field change request or other change notice. In-process work will be included, where appropriate. However, an April 1, 1984 cut-off date will be established to permit valid assessment of previous work.

2D Interview selected, key S&L personnel so that reviewers correctly understand how requirements are interpreted and implemented.

2E Field As-Built Review

To determine if the S&L design samples are configured in the manner for which they were qualified, an independent review of the as-built conditions will be made, by means of system walkdowns.

The purpose is to gain reasonable assurance that the characteristics used in the S&L design have been properly established and utilized, and to apply the criteria to the configuration as they were intended to be used during the licensing process.

The walkdown will visually verify that the selected components and piping have been installed in proper relative positions. The piping isometric walkdown will verify routing and support locations as well as general support arrangement. Selected components and supports will also be inspected to verify such details as relative sizes, weld types, fasteners, and attachments to the structure.

There is no intention for these walkdowns to include material selection and application, fabrication, examination and inspection, or the pre-service inspection requirements that may be applicable or the taking of detailed measurements.

2F Forward potential Observations resulting from the above to the Internal Review Committee, for review and processing.

Task 3
Design Process

General

Task 3 will be to provide an assessment of the effectiveness of the S&L design process for the specified systems. In performing this task, reviews will be made to evaluate the extent to which the design process is sufficiently controlled so that safety-related design requirements are met, and that relevant commitments in the FSAR are complied with. This includes both establishment of suitable controls and implementation of them. In the event there are activities for which procedures were not followed (e.g., not available, deviation from procedures, or no commitment), the actual practices used will be evaluated.

In making this assessment, due consideration will be given to the extent to which engineering judgement is appropriate, in lieu of written procedures. Recognition will be made of the complexity of the work, how unique it is, qualifications of personnel performing it, and other relevant factors.

Care will be taken to establish the time-frame of the design to ensure correct applicability of changing requirements.

Sub-Tasks

- 3A Establish checklists to perform Task 3.

- 3B Review FSAR, S&L procedures (including its QA program), and referenced documents to identify requirements for the design process.

- 3C Interview selected, key S&L personnel so that reviewers correctly understand how requirements are interpreted and implemented.
- 3D Develop flow charts for design of the specified systems.
- 3E Review selected documents in the specified systems for adequacy and completeness of procedural requirements, and for general effectiveness of parts of the process reviewed. Where procedural requirements are not available, the actual process will be evaluated to determine the extent to which the design is adequately controlled.

Documents reviewed will include those related to design criteria, calculations (both by hand and computer), drawings, specifications, and design change authorizations.

The documents will be reviewed for elements which include the following:

1. Adequacy of documentation of the design calculations.
2. Interface design control between S&L and General Electric, and other important design contractors.
3. Design change and configuration controls including use of Field Change Requests (FCRs), Non-Conformance Reports (NCRs) and Engineering Change Notices (ECNs).
4. Design reviews performed by S&L, covering the specified systems, for technical adequacy.
5. As-built drawing reviews to determine degree of compliance with procedures, timeliness of release, and accuracy of information. Performed in conjunction with the system walkdown activity.
6. Such other elements related to design control which are embodied in the FSAR and its referenced documents.

- 3F Forward potential Observations resulting from the above to the Internal Review Committee for review and processing.

Task 4

General Assessment

General

In Task 4, the results of Tasks 2 and 3 will be assembled and analyzed to determine what conclusions can be drawn regarding systems, structures and components which were not reviewed.

This analysis will be performed near the end of the review, using all available information, recognizing that conclusions must be commensurate with the nature of what was reviewed.

A balanced assessment will be sought, and one which emphasizes the likely impact on safety from observations made. As such, both positive and negative results will be considered, and the significance of all of them will be weighed.

Sub-Tasks

- 4A Consolidate all observations into a summary list.
- 4B Analyze the list in 4A for trends and underlying root causes, and possible implications for unreviewed, safety-related areas. As appropriate, this will include identification of underlying causes for possible individual deficiencies identified, and S&L will be expected to investigate possible deficiencies in systems or areas outside the scope of the review.
- 4C Report those broader conclusions commensurate with what was actually reviewed.

III. Processing of Observations

In the event that the review of the specified systems reveals certain design activities which are not accepted by the reviewer, such as potential discrepancies, they will be termed Observations and processed in accordance with an established procedure.

The program for processing will seek to ensure that the Observations made as a result of the review are fully understood, validated, evaluated as to safety-significance, and closed-out through appropriate corrective action. Accordingly, provision is made for complete investigation and examination by Bechtel (Reviewer). To this end, two internal review committees will be established within the Reviewer's organization.

It is also intended that the results of the processing will not be compromised by any lack of independence of the Reviewer. Accordingly, the functions of IP (Owner) and of S&L (Engineer) are essentially restricted to providing information and otherwise clarifying the basis of design while Observations are being considered. Resolution required as a result of Observations will be mutually agreed to by the Owner, Engineer, and Reviewer. If corrective action is required, it will be implemented by the Engineer.

Key steps in processing of potential Observations, all the way to close-out by Reviewer, are shown in Table 2. At any point, however, the processing may be terminated and the Observation closed-out, if Reviewer determines no reporting or other action is appropriate.

TABLE 2
PROCESSING OF OBSERVATIONS

<u>Activity</u>	<u>Responsibility</u>
1. Item discussed in detail with cognizant personnel.	E, R
2. Potential Observation developed during review and forwarded to Level - 1 Internal Review Committee.	R
3. Level - 1 Internal Review Committee confirms Observation is valid.	R
4. Notification to S&L and IP of potential safety significant items.	R
5. For other accurate but non-safety significant items, process as in Steps 9, 10 and 11. For invalid items, process as in Step 9.	E, R
6. For potential safety significant items Level - 2 Internal Review Committee confirms Observation. Confirms if safety significant.	R
7. Prompt notification to IP for safety significant items.	R
8. For safety-significant and for other accurate but non-safety significant items, process as in Steps 9, 10 and 11. For invalid items, process as in Step 9.	E, R
9. Report issued.	R
10. Response made, including proposed corrective action, if appropriate.	E
11. Corrective action proposal accepted.	R
12. Monitoring of above activities	O

KEY

E - Engineer
O - Owner
R - Reviewer

IV. Reports and Documentation

One interim report is planned, describing overall results of the work to date, and including a description of the review program. Also, a final report will be issued covering results of all work performed and including broader conclusions which can be drawn on areas not reviewed.

Reports on individual Observations will be issued when they are confirmed by the Level-1 or Level-2 Internal Review Committee in accordance with Section III. This will be done promptly to permit responses to be immediately initiated and corrective action begun. A standard form will be used for these reports.

The interim and final reports will be issued to IP with copies to S&L and others specified by IP.

A copy of all summary calculations and other documentation which support the individual, interim, and final reports will be provided to IP.

V. Organization

The review will be performed by a Review Team, mostly comprised of senior engineering and project management personnel from Bechtel Power Corporation.

The work of the Review Team will be under the overall direction of the Manager of Engineering, Bechtel Power Corporation. The Programs Manager

will provide direction on matters of program interpretation and implementation, and planning, and coordinate related work with other reviews. The day-to-day activities, however, will be managed by its Project Manager, who reports to the Programs Manager. The Project Manager also receives direction from designated management representatives of Illinois Power Company under terms of the contract and to the extent permitted by this Program Plan.

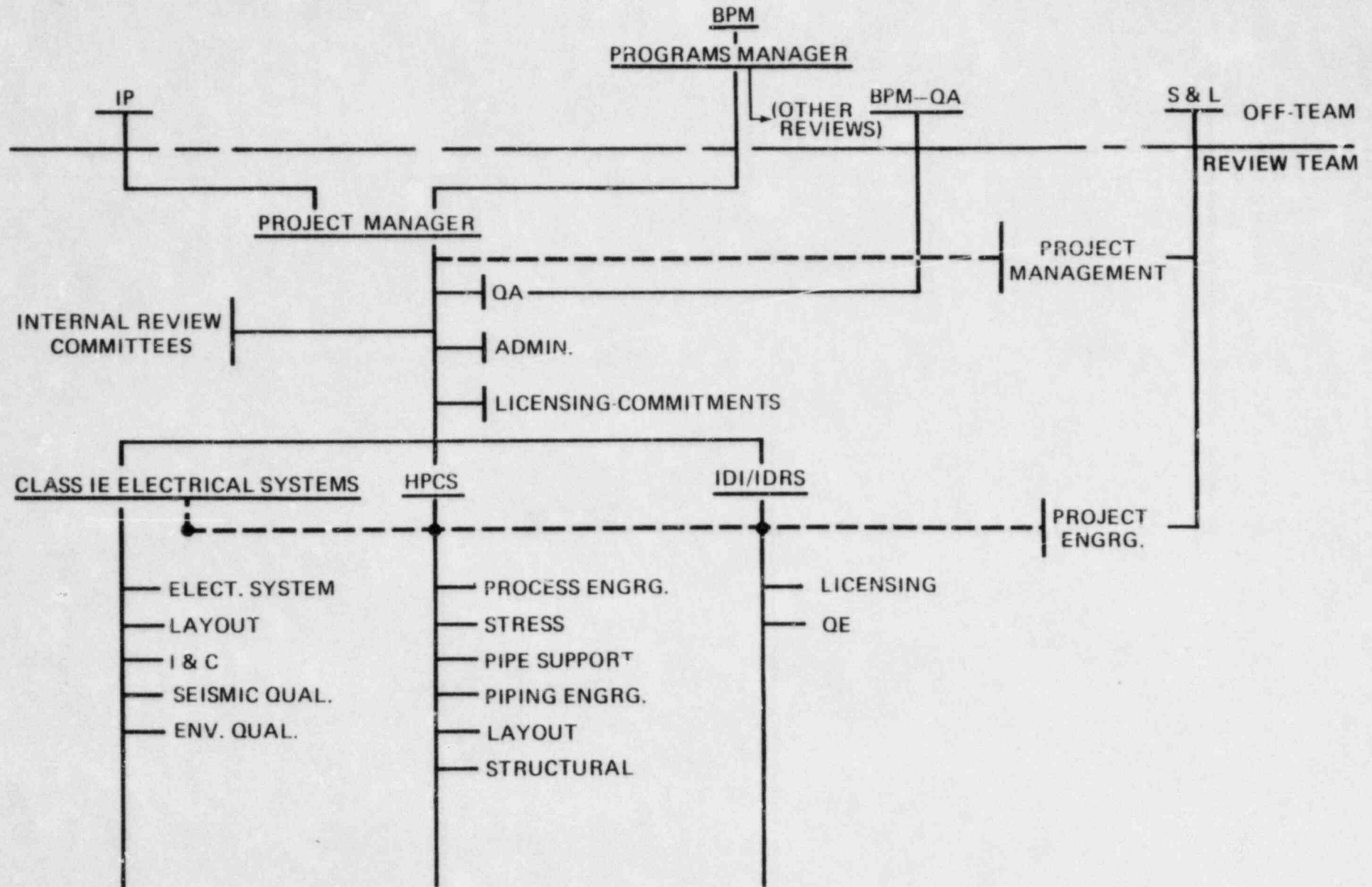
Organization of the Review Team is shown on Figure 1.

The team is comprised of groups organized around the areas to be reviewed. Each group, led by an experienced individual, is responsible for performing all the identified tasks for the respective area.

Members of the groups have been carefully selected to assure qualified, objective, and balanced assessments of what is reviewed. In some cases, individuals may serve in two or more System Groups, as the workload requires. In all cases, their review work will be carefully monitored by management of the Review Team.

The necessary technical expertise will be represented within the Review Team. Special expertise is available from elsewhere in Bechtel when required for technical support including consultation. Current membership of the Review Team and Review Committees is shown on the Clinton Review Roster in Table 3; however, needed changes may be made from time-to-time.

FIGURE-1
IDR TEAM
CLINTON POWER STATION



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———— DIRECTION

- - - - COMMUNICATION

NOTE: EACH SYSTEM GROUP PROVIDES SERVICES TO OTHERS, AS REQUIRED.

Quality Assurance surveillance will be by an assigned Quality Assurance Engineer, who will report directly to the Manager of Quality Assurance, Bechtel Power Corporation.

Team-wide support will be provided in the areas of licensing commitments and administration by individuals reporting to the Project Manager.

Qualifications of Bechtel Power Corporation for design review work are summarized in Appendix C. Resumes of key members of the Review Team and of the Review Committees are included in Appendix D. Qualifications will also be submitted in the Final Report, covering personnel on the IDR team who had significant roles in the IDR related to management, technical, or quality activities.

TABLE 3
CLINTON REVIEW ROSTER

Corporate Management

P. Karpa
J. M. Amaral

Management Sponsor
Quality Assurance Management

Review Team Staff

C. W. Dick
G. L. Parkinson
R. S. Cahn
K. G. Purcell
D. B. Hardie
D. L. Lubin
D. W. Wolfe

Programs Manager
Project Manager
Licensing - Commitments
Administrator
Quality Engineering
Technical Editor
Quality Assurance Engineer

System Groups

A. M. Appleford
R. S. Cahn
A. W. Davis
C. M. Hazari
W. R. Hintz
A. T. Jocson
C. W. Jordan
R. J. Lodwick
W. D. Lowe
A. S. Meyers
M. G. Michail
R. S. Powell
H. Shah
B. S. Shicker
J. A. Shoulders
L. S. Spensko
J. M. Strohm
A. Valachovic, Jr.
C. R. Whitehurst
G. K. Young

Structural Engineering
IDI/IDR Review Leader
I & C Engineering
Electrical System Engineer
Stress Engineering
Process Design
Electrical Systems Group Leader
Process Design
Plant Design
Piping Engineering
Structural Engineering
HPCS Systems Group Leader
Pipe Support Design
Structural Engineering
Process Design
Quality Engineering
Environmental Qualification
Fire Protection
Seismic Qualification
Electrical Systems Engineering

Level-1 Internal Review Committee

R. S. Cahn
C. W. Dick
D. B. Hardie
C. W. Jordan
G. L. Parkinson
R. S. Powell

IDI/IDR Review Leader
Programs Manager
Quality Engineering
Electrical System Group Leader
Project Manager
System Group Leader

Level-2 Internal Review Committee

S. A. Bernsen
A. L. Cahn
R. P. Schmitz

Project Manager, BPC
Bechtel Power Management Consultant
Chief Nuclear Engineer, BPC

VI. Schedule

Review work will be keyed to the target milestone dates shown below:

June 15, 1984	Begin Preliminary Work
September 30, 1984	Issue Interim Report
November 16, 1984	Issue Draft Final Report
December 15, 1984	Issue Final Report

More detailed schedules will be developed after initial reviews have taken place. However, it is not expected that the nature of the work will permit the detail of scheduling that is normally performed on a design-construction project, primarily because the nature and number of Observations are not known in advance. The schedules will include proposed start of formal design review, estimated bounding dates for IDR activities, and issuance of the Final Report.

The date for the Interim Report will be considered firm, and the results of work performed to that date will be reported.

The date for the Final Report will be considered as a target date, which may be adjusted several weeks earlier or later, depending on progress and results of the review. In the event that ongoing work justifies completion and limited additional time is needed, the completion date may be delayed. Likewise, every reasonable effort will be made to complete the review in the shortest possible time, consistent with achieving objectives of the review.

The overall guidelines to be employed will be to complete sufficient review work to produce a Final Report, which will not require further review work by the Reviewer or others.

APPENDIX A

PROTOCOL AND FORMS

June 19, 1984

PROTOCOL GOVERNING CONDUCT OF
INDEPENDENT DESIGN REVIEW (IDR)
OF CLINTON POWER STATION (CPS)

In the conduct of the IDR by Bechtel Power Corporation (BPC), the following protocol shall be adhered to:

1. Recommendations, findings, evaluations and all exchange of correspondence, including drafts, between BPC and Illinois Power Company (IP) (including its contractors and subcontractors) will be submitted to the Regional Administrator at the same time as they are submitted to IP.
2. BPC may request documentary material, meet with and interview individuals, conduct telephone conversations, or visit the site to obtain information without prior notification to the NRC. All communications and transmittals of information shall, however, be documented and such documentation shall be maintained in a location accessible for NRC examination. Communications between BPC and IP solely with respect to the financial and administrative aspects of the IDR contract are outside the scope of this protocol.

3. If BPC wishes to discuss with IP substantive matters related to information obtained, to provide an interim report to IP, or to discuss its findings or conclusions with IP in advance of completing its report, or if IP desires such communication, such discussions shall be accomplished in meetings open to public observation. In this regard, IP shall provide a minimum of five days advance notice to the Regional Administrator of any such meeting. The Regional Administrator shall make reasonable efforts to notify representatives of interested members of the public of the meeting, but the inability of any such person to attend shall not be cause for delay or postponement of the meeting. Transcripts or written minutes of all such meetings should be prepared by the organization requesting the meeting and provided to the NRC in a timely manner. Any portion of such meetings which deals with proprietary information may be closed to the public.
4. All meetings between the Staff and IP and/or BPC will be open to public observation, except where the Staff determines that it is appropriate to conduct a meeting(s) in private with IP and/or BPC.

5. All documents submitted to, or transmitted by, the NRC subject to this protocol, unless exempt from mandatory public disclosure, will be placed in the NRC Public Document Rooms in Clinton, Illinois, and Washington, D.C., and will be available there for public examination and copying.

CLINTON IDR
PERSONNEL QUESTIONNAIRE

After first being duly sworn _____ hereby
deposes and says: (print or type name)

1. I have no previous involvement with the Clinton Project, except as noted on the reverse side.
2. I have not previously been hired by IP, Sargent & Lundy (S&L), or a Clinton site contractor (Baldwin Associates, General Electric) to perform similar audits, except as noted on the reverse side.
3. I have not been previously employed by IP, S&L, or a Clinton site contractor, except as noted on the reverse side.
4. I do not own or control stock of IP, S&L, or a Clinton site contractor, except as noted on the reverse side.
5. No member of my present household is employed by IP, S&L, or a Clinton site contractor, except as noted on the reverse side.
6. None of my relatives is employed by IP, S&L, or a Clinton site contractor, except as noted on the reverse side.
7. I have not been offered future employment by IP, S&L, or a Clinton site contractor, except as noted on the reverse side.

I hereby affirm that the above is true and correct to the best of my knowledge.

(signature)

(date)

Subscribed and sworn to before me on this _____ day
of _____, 1984.

My commission expires: _____

Notary Public

AGREEMENT CONCERNING
INDEPENDENT DESIGN REVIEW
OF CLINTON POWER STATION

I _____ (print or type name)
hereby agree that:

- 1) I will notify the Team Leader if during the term of this project I, or any member of my immediate family (parents, spouse, children and grandchildren) acquire any financial interest in Illinois Power Company, Sargent & Lundy or any site contractor at the Clinton Power Station (Baldwin Associates, General Electric Company).
- 2) If I identify what I believe to be a potential discrepancy having the potential for a significant safety impact, I will immediately notify the Team Leader for further evaluation.
- 3) I will treat all information revealed to me in the course of my work on this project as confidential and will not disclose it to others not involved in the project except as directed by the Team Leader.

Signature

Date

APPENDIX B

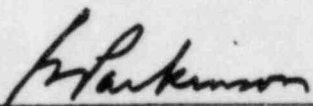
QUALITY ASSURANCE PROGRAM

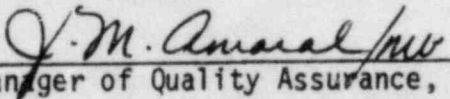
QUALITY ASSURANCE PROGRAM

INDEPENDENT DESIGN REVIEW OF CLINTON POWER STATION, UNIT 1

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<u>Section</u>	<u>Title</u>
1.0	Introduction
2.0	Organization
3.0	Design Control
4.0	Document Control
5.0	Audits

Approved by  Date 7/10/84
Project Manager

 Date 7/10/84
Manager of Quality Assurance, BPC

INDEPENDENT DESIGN REVIEW OF THE CLINTON POWER STATION, UNIT 1

QUALITY ASSURANCE PROGRAM PLAN

1.0 INTRODUCTION

1.1 Scope

This plan establishes the quality assurance program requirements for work performed by Bechtel on the independent design review of the Clinton Power Station, Unit 1. This plan provides controls for quality related activities commensurate with the scope of Bechtel services, defined in the contract documents.

1.2. Quality Program

The quality assurance program meets the applicable requirements of 10 CFR, Part 50, Appendix B, as described in the NRC approved Bechtel Topical Report, BQ-TOP-1, "Bechtel Quality Assurance Program for Nuclear Power Plants," Revision 3A. This program plan describes provisions for compliance with the applicable criteria of 10 CFR, Part 50, Appendix B. These criteria are organization, design control, document control, and audits.

Bechtel personnel participating in the quality program are provided with indoctrination and training covering the general quality assurance program and specific project procedures applicable to their work. Quality assurance auditors are qualified to

ANSI N45.2.23. Records are maintained showing completion of indoctrination, training and qualification. The indoctrination, training, and qualifications are conducted in accordance with written procedures.

1.3 Program Documents

In addition to this program plan, procedures for implementing this plan are listed in the Quality Program Document List. Procedures are prepared and controlled by the cognizant department which issues the procedure. The program plan and procedures, when approved and issued, are controlled documents subject to the controls of the Document Control section of this plan.

2.0 ORGANIZATION

The organization chart of the Clinton Review Team is depicted in the Program Plan, Independent Design Review of Clinton Power Station, Unit 1 (IDR).

2.1 Review Team Management

The Project Manager is the leader of the design review team and is responsible for the overall execution of the review activities, including the direction, coordination, and communication necessary to reflect client requirements, Bechtel policies, and implementing procedures. The Project Manager reports to the Programs Manager, BPC. The Project Manager provides direction to the design review

team which includes personnel from engineering disciplines to accomplish the independent design review tasks. The Project Quality Assurance Engineer is also a member of the design review team, but his relationship with the Project Manager is one of coordination.

2.2 Engineering Personnel

The organization and responsibilities of the engineering personnel in the design review team are described in the IDRP.

2.3 Quality Assurance Personnel

The quality assurance program defined in this program plan is directed and controlled by the Project Quality Assurance Engineer (PQAE). The PQAE reports to the BPC Manager of Quality Assurance, who is responsible for approval of the quality assurance program plan for this design review effort. The functions of the PQAE include:

- 1) Coordinate the establishment of the project quality assurance program.
- 2) Monitor and/or perform audits to determine conformance of quality related activities to the quality assurance program.
- 3) Review and approve quality related procedures for quality assurance program compliance.
- 4) Prepare written action requests as necessary to obtain remedial action on deficiencies noted during QA monitoring activities.
- 5) Maintain a QA activity log.

3.0 DESIGN CONTROL

3.1 General

The design review shall be controlled by the requirements of this program plan. The activities shall be performed in accordance with approved plans and/or procedures, which include the necessary control elements for the use of the design review organization. The contents of the plans/procedures shall clearly state the requirements, describe the practices and identify the personnel responsible for taking action. The plans/procedures shall meet the requirements of ANSI N45.2.11 for the applicable design control, interface, and review activities. Preparation and issuance of the plans/procedures shall precede the start of the related design review activity. The plans/procedures shall be approved by the Project Manager and reviewed by the PQAE for compliance with quality program requirements prior to issuance.

3.2 Requirements

The following activities shall be described in design review plans and/or procedures:

- 1) Preparation and control of design review plans and/or procedures.
- 2) Determination of system design compliance with FSAR requirements.
- 3) Evaluation for the adequacy of the system design.

- 4) Evaluation for the adequacy of the system design process, including the use of engineering judgements and assumptions, and standard design methods.
- 5) Evaluation for the adequacy of the documentation of design calculations.
- 6) Review for design interface compliance within the system design.
- 7) Review for proper safety classification of systems, structures and components per 10CFR50.
- 8) Evaluate for adequacy of the design change control process, including FCRs, NCRs and ECNs.
- 9) Assess the effectiveness of the design review performed by the originator of the system design and the review process used.
- 10) Identify potential safety concerns in the system design and notify IP of these concerns.
- 11) Conduct of field as-built walkdown.

4.0 DOCUMENT CONTROL

4.1 General

Each organization is responsible for the preparation and control of the manuals, plans, procedures, and policies which identify the methods and practices used in the implementation of the quality assurance program. Table 4.0-1 lists the manuals, plans or procedure sets of the quality assurance program documents and defines the originator, review and approval authority for these documents. Changes to these documents shall require the same review and approval as the original document. These documents shall be approved by quality assurance prior to issuance.

Preliminary and final reports of the design review activities shall be prepared by the design review team. The reports shall be approved by the Project Manager prior to issuance to IP.

4.2 Document Control

Each organization that prepares manuals, plans, procedures, and policies to implement the quality assurance program shall provide measures for controlling the following elements:

- 1) Preparing, approving, issuing, and revising these documents.
- 2) Identifying the controls of the procedure sets or manual (e.g., Table of Contents).
- 3) Controlling distribution of documents to cognizant organization/personnel who perform the prescribed activity.
- 4) Establishing effectivity (e.g., dates) of manuals and procedures including revisions thereto.

4.3 Document Turnover

A plan for the turnover of program documents shall be established by the Project Manager. The turnover of documents may be done progressively upon issuance of the document or at the time of completion of the design review effort. The turnover plan shall be concurred with by IP.

Bechtel retention of these documents shall be determined by the Project Manager.

TABLE 4.0-1

QUALITY ASSURANCE PROGRAM DOCUMENTS

<u>Document</u>	<u>Originating Authority</u>	<u>Review for QA Program Compliance</u>	<u>Authorizing Approval</u>	<u>Contents</u>
Quality Assurance Program Plan	PQAE	Manager of QB-BPC	Project Manager(1)	Quality Assurance program policies
Engineering Procedures	Designated Individual	PQAE	Project Manager	Responsibilities and practices for engineering activities
Project Quality Assurance Procedures	PQAE	PQAE	QA Manager	Procedures for conducting Project QA activities (2)
Independent Design Review Plan - Clinton Station, Unit 1	Designated individual	PQAE	Project Manager	Responsibilities and practices for design review activities

(1) Authorizes application on project

(2) PQAE activities, per Section 5.0

5.0 AUDITS

5.1 General

The audit program includes both quality assurance monitoring of design review activities and formal quality assurance audits, as appropriate. Quality assurance audits and monitoring activities are planned, scheduled, performed, reported, and closed under the cognizance of the Project Quality Assurance Engineer (PQAE). Monitoring activities are not intended to be as wide in scope as QA audits, but will be in-depth for the particular area monitored. The PQAE is independent from the activities it is responsible for auditing and monitoring; is provided access to appropriate levels of management; and is provided access to documents and personnel necessary for the planning and performance of audits and monitoring activities. The PQAE has the discretion to perform either monitoring or auditing activities to verify effective implementation of the quality assurance program.

5.2 Audit Requirements

Quality assurance audit activities shall be performed in accordance with the following procedures:

- 1) Audit personnel qualification per QADP B-8
- 2) Perform quality assurance audit per QDAP C-5.

5.3 Monitoring Requirements

Quality assurance monitoring activities shall be performed in accordance with the following procedures:

- 1) Perform quality assurance monitoring per QADP C-1.
- 2) Documenting monitoring activities per QADP C-3.
- 3) Requesting action per QAP B-10.

APPENDIX C

SUMMARY OF
BECHTEL QUALIFICATIONS
FOR
INDEPENDENT DESIGN REVIEWS

SUMMARY OF
BECHTEL QUALIFICATIONS
FOR
INDEPENDENT DESIGN REVIEWS

This summarizes Bechtel's experience and qualifications in the nuclear power industry, in general, and in engineering design reviews, in particular.

Bechtel has been involved in the nuclear power industry since its inception. This permits bringing significant experience to bear on the Clinton Independent Design Review, related to the engineering, construction, costing/scheduling and startup of nuclear power plants. The experience also includes design-reviews, federal and local licensing assistance, industry standards, quality assurance and quality control, and project management. Bechtel will soon reach the milestone of significant involvement in the development of 200,000 MWe of generating capacity for nuclear and fossil-fired units. The nuclear plant involvement includes 112 units representing over 90,000 MWe. There are currently 29 nuclear units under design and/or construction by Bechtel.

The design review experience covers detailed engineering design, design process evaluations, quality assurance and FSAR licensing commitments. These reviews have covered systems, components, and structures and have ranged from detailed in-depth technical reviews to partial system reviews. Bechtel's experience with the review process, both as the reviewer and the reviewee, will provide a perspective which will be of particular benefit to the

Clinton Independent Design Review effort. In addition, Bechtel has been similarly involved in reviews of construction quality which further adds to its ability to assess adequacy of design.

The accompanying Tables C1 and C2 contain a summary of Bechtel involvement in independent design reviews.

Table C1

INDEPENDENT DESIGN REVIEWSPERFORMED ON BECHTEL PROJECTS BY OTHERS

<u>PROJECT</u>	<u>DATE</u>	<u>REVIEWER</u>	<u>TYPE/COMMENTS</u>
Susquehanna	1982	Teledyne Engineering Services (TES)	Feedwater system (vertical review)
Diablo Canyon	1982 and 1983	TES - Review Manager Stone & Webster R.L. Cloud Assoc. R.F. Reedy	Systems review - 3 systems (vertical) Seismic review - all aspects QA review - design process
San Onofre	1981	Torrey Pines	Review of selected critical systems and components
Midland	1983 - Present	TERA	Three systems (vertical)
Callaway (SNUPPS)	1982	NRC	Integrated design investigation (IDI) of aux. feedwater system
South Texas	1983 - Present	Stone & Webster	Ongoing design review (assessment) of selected systems and components
Grand Gulf	1982	Cygna	General FSAR review
Palo Verde	1982	Torrey Pines	QA review of design process
Maanshan (Taiwan)	1982	NUS Corp.	General licensing review (PSAR/FSAR)

Table C2

INDEPENDENT DESIGN REVIEWSPERFORMED BY BECHTEL

<u>PROJECT</u>	<u>DATE</u>	<u>TYPE/COMMENTS</u>
Midland	1982	Design review of important systems and structures (horizontal and vertical, for selected areas)
Vogtle	1982	Design review of important systems and structures (horizontal and vertical, for selected areas)
South Texas	1983 - 1984	Design review of important systems and structures (horizontal and vertical, for selected areas)
Diablo Canyon	1982 - Present	Review of power plant seismic design and other safety-related features (both as reviewer and reviewee)
Zimmer	1983	Design completion and overall adequacy
Byron	1984	Design review of three key systems (vertical)

APPENDIX D

RESUMES

RESUMES

Resumes for the principal personnel on the Review Team and the Internal Review Committees are indicated herein.

Listed below, in alphabetical order, are names of people covered by these resumes.

J. M. Amaral	Quality Assurance Management
A. M. Appleford	Structural Engineering
S. A. Bernsen	Project Manager, BPC
A. L. Cahn	Bechtel Power Management Consultant
R. S. Cahn	Licensing - Commitments
A. W. Davis	I & C Engineering
C. W. Dick	Programs Manager
D. B. Hardie	Quality Engineering
C. M. Hazari	Electrical System Engineer
W. R. Hintz	Stress Engineering
A. T. Jocson	Process Design
C. W. Jordan	Electrical Systems Group Leader
P. Karpa	Management Sponsor
R. J. Lodwick	Process Design
W. D. Lowe	Plant Design
D. L. Lubin	Technical Writer
A. S. Meyers	Piping Engineering
M. G. Michail	Structural Engineering
G. L. Parkinson	Project Manager
R. S. Powell	HPCS Systems Group Leader
K. G. Purcell	Administrator
R. P. Schmitz	Chief Nuclear Engineer, BPC
H. Shah	Pipe Support Design
B. S. Shicker	Structural Engineering
J. A. Shoulders	Process Design
L. S. Spensko	Quality Engineering
J. M. Strohm	Environmental Qualification
A. Valachovic, Jr.	Fire Protection
C. R. Whitehurst	Seismic Qualification
D. W. Wolfe	Quality Assurance Engineer
G. K. Young	Electrical Systems Engineering

Bechtel Power Corporation

Engineers—Constructors

Fifty Beale Street

San Francisco, California

Mail Address: P.O. Box 3965, San Francisco, CA 94119



July 10, 1984

BLI-06

Mr. J. D. Geier
Illinois Power Company
500 South 27th Street
Decatur, Illinois 62525

Subject: Clinton Power Station, Independent Design Review
Illinois Power Co.
Job No. 15478-003
Example Review Plans

Dear Mr. Geier:

As agreed in our June 28, 1984 meeting with the NRC we are enclosing a package of review plans (checklists) which are examples of what we are likely to use on the subject review. These are provided to illustrate, in more detail, the extent of what we plan to review under the Program Plan (Rev. 0) dated July 1984.

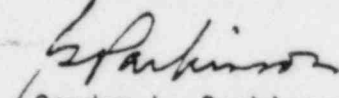
Some of these plans are quite similar to checklists employed in other Bechtel reviews, but have been adapted to the special requirements of the Clinton IDR. We believe they provide a significant degree of detail describing our proposed IDR. However, at Bechtel's option, the plans may be revised in order to be responsive to evolving developments in the review program.

We have chosen to provide these Review Plans, separately, rather than as part of the Program Plan because it appeared more consistent with the procedure for review and approval of the Program Plan. It is understood that the Program Plan is subject to prior approval whereas the Review Plans are not. Also, the Review Plans are regarded as implementing documents for the Program Plan.

MR. J. D. Geier
July 10, 1984
Page Two

In the event you have any questions regarding the Review Plans or the extent of our proposed review, we will be pleased to respond. In the meantime, we trust this satisfies our agreement in this matter.

Very truly yours,


Gordon L. Parkinson
Project Manager

GLP/mp

cc: M. Axelrad - N&H, w/encl.
D. P. Hall - IP, w/ encl.
J. Milhoan - NRC, w/encl.
B. L. Siegel - NRC, w/encl.